IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

In re Application of HUBERT SJOERD BLAAUW ET AL.	Atty. Docket NL 020701
	Confirmation No. 1272
Serial No. 10/523,431	Group Art Unit: 3724
Filed: JANUARY 28, 2005	Examiner: LANDRUM, E. F.

Title: WEAR-RESISTANT STAINLESS CUTTING ELEMENT OF AN ELECTRIC SHAVER, ELECTRIC SHAVER, AND METHOD OF PRODUCING SUCH A CUTTING ELEMENT

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APPEAL BRIEF

Sir:

Appellants herewith respectfully present a Brief on Appeal as follows, where a Notice of Appeal is concurrently filed:

REAL PARTY IN INTEREST

The real party in interest in this appeal is the assignee of record Koninklijke Philips Electronics N.V., a corporation of The Netherlands having an office and a place of business at Groenewoudseweg 1, Eindhoven, Netherlands 5621 BA.

RELATED APPEALS AND INTERFERENCES

Appellants and the undersigned attorney are not aware of any other appeals or interferences which will directly affect or be directly affected by or having a bearing on the Board's decision in the pending appeal.

STATUS OF CLAIMS

Claims 1-7, 10-17, and 25-28 are pending in this application, where claims 8-9 and 18-24 are canceled. Claims 1-7, 10-17, and 25-28 are rejected in the Final Office Action mailed on December 3, 2009. Claims 1-7, 10-17, and 25-28 are the subject of this appeal.

STATUS OF AMENDMENTS

Appellants did not file a Response to a Final Office Action mailed December 3, 2009. This Appeal Brief is in response to the Final Office Action mailed December 3, 2009, that finally rejected claims 1-7, 10-17, and 25-28.

SUMMARY OF THE CLAIMED SUBJECT MATTER

The present invention, for example, as recited in independent claim 1, shown in FIGs 1-6, and described on page 2, line 9, to page 3, line 25; and page 4, line 7, to page 5, line 31 of the specification, is directed to a cutting element as used in an electric shaver, manufactured from maraging or precipitation-hardenable stainless steel with a surface hardened by plasma nitriding, where the cutting element is precipitationally hardened simultaneously with the plasma nitriding on all surfaces of the cutting element. This forms a surface top layer of steel supersaturated with nitrogen, and a diffusion layer adjoining the top layer with a hardness ranging from the hardness of the top layer to the hardness of the steel before hardening so that the top layer has a substantially uniform hardness and the diffusion layer has a decreasing hardness with depth of the diffusion layer. As shown in FIG 6 and page 4, lines 29-33 and page 5, lines 25-32, the decreasing hardness of the diffusion layer decreases from outer portions of the diffusion layer toward a center of the diffusion layer and meets at the center of the diffusion layer to form a minimum peak at the center, where the hardness at the center of the diffusion layer is an original hardness the stainless steel.

The present invention, for example, as recited in independent claim 7, shown in FIGs 1-6, and described on page 2, line 9, to page 3, line 25; and page 4, line 7, to page 5,

line 31 of the specification, is directed to an electric shaver comprising a cutting element, the cutting element being precipitationally hardened simultaneously with plasma nitriding on all surfaces of the cutting element. This forms a surface top layer of steel supersaturated with nitrogen and a diffusion layer adjoining the top layer with a hardness ranging from the hardness of the top layer to the hardness of the steel before hardening so that the top layer has a substantially uniform hardness and the diffusion layer has a decreasing hardness with depth of the diffusion layer. As shown in FIG 6 and page 4, lines 29-33 and page 5, lines 25-32, the decreasing hardness of the diffusion layer decreases from outer portions of the diffusion layer toward a center of the diffusion layer and meets at the center of the diffusion layer to form a minimum peak at the center, where the hardness at the center of the diffusion layer is an original hardness the stainless steel.

The present invention, for example, as recited in independent claim 10, shown in FIGs 1-6, and described on page 2, line 9, to page 3, line 25; and page 4, line 7, to page 5, line 31 of the specification, is directed to an electric shaver, comprising a stainless steel cutting element having a hardened layer on all surfaces of a blade and being precipitationally hardened simultaneously with plasma nitriding on the all surfaces of the cutting element. This forms a surface top layer of steel supersaturated with nitrogen and a diffusion layer adjoining the top layer with a hardness ranging from the hardness of the top layer to the hardness of the stainless steel before hardening so that the top layer has a

substantially uniform hardness and the diffusion layer has a decreasing hardness with depth of the diffusion layer. As shown in FIG 6 and page 4, lines 29-33 and page 5, lines 25-32, the decreasing hardness of the diffusion layer decreases from outer portions of the diffusion layer toward a center of the diffusion layer and meets at the center of the diffusion layer to form a minimum peak at the center, where the hardness at the center of the diffusion layer is an original hardness the stainless steel.

The present invention, for example, as recited in independent claim 17, shown in FIGs 1-6, and described on page 2, line 9, to page 3, line 25; and page 4, line 7, to page 5, line 31 of the specification, is directed to a method comprising forming a cutting element from austenitic stainless steel; and precipitationally hardening the cutting element at a same temperature simultaneously with plasma nitriding on the all surfaces of the cutting element. This forms a first layer having a substantially uniform hardness and a second layer having a decreasing hardness with depth of the second layer. As shown in FIG 6 and page 4, lines 29-33 and page 5, lines 25-32, the decreasing hardness of the second layer decreases from outer portions of the second layer toward a center of the second layer and meets at the center of the diffusion layer to form a minimum peak at the center, wherein the hardness at the center of the diffusion layer is an original hardness the stainless steel.

GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

Whether claim 17 of U.S. Patent Application Serial No. 10/523,431 is unpatentable under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-6 of co-pending U.S. Patent Application No. 10/522,287.

Whether claims 1, 4-7, 10, 13-14, 16 and 25-27 of U.S. Patent Application Serial No. 10/523,431 are unpatentable under 35 U.S.C. §103(a) over U.S. Patent No. 6,354,008 (Domoto) in view of JP 60-162766 (Oiwa), U.S. Patent No. 5,953,969 (Rosenhan) and in witness of Applicants' Admitted Prior Art (AAPA), an Article by Liang et al. entitled "Low Pressure Plasma Arc Source Ion Nitriding Compared with Glow-Discharge Plasma Nitriding of Stainless Steel" (Liang), an Article by Blawert et al. entitled "Surface Treatment of Nitriding Steel 34CrAlNi7: Comparison between Pulsed Plasma Nitriding and Plasma Immersions ion Implantation" (Blawert), book by Askeland entitled "The Science and Engineering of Materials" (Askeland), and U.S. Patent No. 6,662,614 (Lim).

Whether claims 2-3 and 11-12 of U.S. Patent Application Serial No. 10/523,431 are unpatentable under 35 U.S.C. §103(a) over Domoto in view of U.S. Patent No. 5,857,260 (Yamada).

Whether claim 15 of U.S. Patent Application Serial No. 10/523,431 is unpatentable under 35 U.S.C. §103(a) over Domoto in view of U.S. Patent No. 6,584,691 (Gerasimov).

Whether claims 17 and 28 of U.S. Patent Application Serial No. 10/523,431 are unpatentable under 35 U.S.C. §103(a) over Domoto in view of U.S. Patent No. 4,259,126 (Cole).

ARGUMENT

Claim 17 is said to be unpatentable under the judicially created doctrine of obviousness-type double patenting over claims 1-6 of co-pending U.S. Patent Application No. 10/522,287.

This rejection is respectfully traversed. Further, it should be noted that claims 2 and 5-7 of co-pending U.S. Patent Application No. 10/522,287 had been canceled. In particular, claims 1, and 3-4 of co-pending U.S. Patent Application No. 10/522,287 do not disclose or suggest "the decreasing hardness of the second layer decreasing from outer portions of the second layer toward a center of the second layer and meeting at the center of the diffusion layer to form a **minimum peak at the center**, wherein a hardness at the center of the diffusion layer is an **original** hardness the stainless steel," as recited in claim 17. (Illustrative emphasis provided) Rather, claims 1, and 3-4 of co-pending U.S. Patent Application No. 10/522,287 merely recite "plasma-nitriding of a shaver blade at a temperature between 300°C and 380°C" (claim 1), "wherein the plasma-nitriding is carried out simultaneously with or consecutively to precipitation-hardening" (claim 3), and "wherein at least one of the plasma-nitriding and the precipitation-hardening is carried out at a temperature between 300°C and 375°C" (claim 4). There is simply no disclosure or suggestion in claims 1, and 3-4 of the co-pending U.S. Patent Application No. 10/522,287 of a layer with decreasing hardness toward the layer center, and "meeting at the center of the diffusion layer to form a **minimum peak at the center**, wherein a hardness at the center of the diffusion layer is an **original** hardness the stainless steel," as recited in claim

17. (Illustrative emphasis provided)

Accordingly, it is respectfully submitted that the double patenting rejection should be reversed.

Claims 1, 4-7, 10, 13-14, 16 and 25-27 are said to be unpatentable under 35 U.S.C. §103(a) over Domoto, Oiwa, Rosenhan, AAPA, Liang, Blawert, Askeland and Lim.

Appellants respectfully request the Board to address the patentability of independent claims 1, 7, 10 and 17 and further claims 2-7, 11-16, and 25-28 as depending from claims 1, 7, 10 and 17, based on the requirements of independent claims 1, 7, 10 and 17. This position is provided for the specific and stated purpose of simplifying the current issues on appeal. However, Appellants herein specifically reserve the right to argue and address the patentability of claims 2-7, 11-16, and 25-28 at a later date should the separately patentable subject matter of claims 2-7, 11-16, and 25-28 later become an issue. Accordingly, this limitation of the subject matter presented for appeal herein, specifically limited to discussions of the patentability of claims 1, 7, 10 and 17 is not intended as a waiver of Appellants' right to argue the patentability of the further claims and claim elements at that later time.

Domoto is directed to a sliding member having a sliding surface 2 for sliding contact with a cooperative member. A protective film 5b is deposited not only on the sliding surface 2 but also on a surface region immediately adjacent the sliding surface 2. As correctly noted on page 3, second paragraph of the Final Office Action, Domoto does not disclose or

suggest that a cutting element is precipitationally hardened simultaneously with the plasma nitriding on all surfaces of the cutting element to form a surface top layer of steel supersaturated with nitrogen and a diffusion layer. Oiwa and Rosenhan are cited in an attempt to remedy the deficiencies in Domoto.

Oiwa is directed to an electric razor where a dense nitride film is formed on the surface of the outer blade to improve the durability and to reduce a sliding load. The outer blade is made of Ni or stainless steel and the dense nitride film is formed on the surface of the outer blade by plasma nitriding.

Rosenhan is directed to a screwdriver bit where its surface is hardened due to nitrating, and has softer region of a core. As clearly shown in FIG 2, the hardness decreases away from the center to reach a **plateau** near the center.

Lin is directed to a tool and its finishing method of surface for center fin member of an air conditioning apparatus for a vehicle. Column 7, line 64 to column 8, line 8 recite:

> Where the TiC, TiN, or TiCN coating is directly deposited over the tooth crests under the condition, in which the above mentioned plasma nitrification is not conducted, it may be easily peeled off because an ionospheric layer may be formed at the interface between the surfaces of the tooth crest and the coating due to a great hardness difference exhibited between the surfaces of the tooth crests and the coating. For this reason, it is necessary to form a relatively thick plasma nitride layer having a hardness ranged between those of the tooth crests and coating. (Emphasis added)

It is respectfully submitted that Domoto, Oiwa, Rosenhan, Lim, and combination thereof, do not teach or suggest the present invention as recited in independent claim 1, and similarly recited in independent claims 7 and 10 which, amongst other patentable

features, recites (illustrative emphasis provided):

> wherein the cutting element is precipitationally hardened **simultaneously** with the plasma nitriding on all surfaces of the cutting element to form a surface top layer of steel supersaturated with nitrogen and a diffusion layer adjoining the top layer with a hardness ranging from the hardness of the top layer to the hardness of the steel before hardening so that the top layer has a substantially uniform hardness and the diffusion layer has a decreasing hardness with depth of the diffusion layer, the decreasing hardness of the diffusion layer decreasing from outer portions of the diffusion layer toward a center of the diffusion layer and **meeting at the center** of the diffusion layer to form a minimum peak at the center.

A cutting element which is precipitationally hardened **simultaneously** with the plasma nitriding is nowhere disclosed or suggested in Domoto Oiwa, Rosenhan and Lim, alone or in combination. Rather, column 2, lines 27-29 of Rosenhan merely recites that "heat treatment--age-hardening or precipitation-hardening--is to be combined with plasma nitrating." It is respectfully submitted that such a disclosure does not teach or suggest to precipitationally harden a cutting element **simultaneously** with the plasma nitriding, as recited in independent claims 1, 7 and 10.

Further, Lim merely discloses that it is "necessary to form a relatively thick plasma nitride layer having a hardness ranged between those of the tooth crests and coating," as recited on column 8, lines 6-8.

In addition, the section of AAPA noted on page 4, line 11 of the Final Office Action, namely, page 4, lines 26-28, does NOT describe the prior art; rather this description is related to the present invention.

Assuming, arguendo, that somehow the combination of Domoto, Oiwa, Rosenhan

and Lim discloses or suggests to harden a cutting element **simultaneously** with the plasma nitriding, it is respectfully submitted that the combination of Domoto, Oiwa and Rosenhan still does not disclose or suggest a diffusion layer with decreasing hardness that decreases "from outer portions of the diffusion layer toward a center of the diffusion layer and **meeting at the center** of the diffusion layer **to form a minimum peak at the center**," as recited in independent claim 1, and similarly recited in independent claims 7, 10 and 17. Rather, Rosenhan shows in FIG 2 that the hardness decreases away from the center to reach a **plateau** near the center.

Further, it is respectfully submitted that a diffusion layer with decreasing hardness that decreases "from outer portions of the diffusion layer toward a center of the diffusion layer and **meeting at the center** of the diffusion layer **to form a minimum peak at the center**," as recited in independent claim 1, and similarly recited in independent claims 7 and 11, is NOT intrinsic to the process of hardening, as alleged on page 5, second full paragraph of the Final Office Action. Hardening may be performed to obtain a variety of differently hardened elements. For example, the hardening may be performed to form a uniformly hardened steel, or a steel with a hardness that decreases away from the center to reach a **plateau** near the center, as shown in FIG 2 of Rosenhan.

For example, the specification recites on page 5, lines 3-6 that:

> **If the blade was uniformly hardened through and through** to a hardness of 1500 HV, it would **become very brittle** and consequently would **snap easily**. With the process according to the invention this disadvantage is avoided. (Emphasis added)

Accordingly, there is nothing 'intrinsic' about the particular recitation in independent claims 1, 7 and 10. In particular, a diffusion layer with decreasing hardness that decreases "from outer portions of the diffusion layer toward a center of the diffusion layer and **meeting at the center** of the diffusion layer **to form a minimum peak at the center**," as recited in independent claim 1, and similarly recited in independent claims 7 and 10, is NOT intrinsic to the process of hardening, and provides substantial benefits. Rather, hardening may be performed to provide a uniform hardness throughout the blade, or may be performed to provide **plateau** below the surface, as in Rosenhan.

For example, if hardening is not performed long enough, then a **plateau** having a certain hardness would result near the center **without** "meeting at the center of the diffusion layer to form a minimum peak at the center." (Independent claims 1, 7, 10 and 17) Further, if hardening is performed for too long, then the hardness at the center would no longer be the original hardness; rather the hardness at the center would be greater than the original hardness.

It is respectfully submitted that Domoto, Oiwa, Rosenhan, Lim, and combination thereof, do not disclose or suggest that a decreasing hardness "meeting at the center of the diffusion layer to form a minimum peak at the center, wherein a **hardness at the center** of the diffusion layer **is an original hardness** the stainless steel", as recited in independent claim 1, and similarly recited in independent claims 7 and 10. (Illustrative emphasis provided) AAPA, Liang, Blawert and Askeland are cited to allegedly show other features and do not remedy the deficiencies in Domoto, Oiwa, Rosenhan and Lim.

Accordingly, it is respectfully submitted that independent claims 1, 7 and 10 are allowable, and allowance thereof is respectfully requested. In addition, it is respectfully submitted that claims 4-6, 13-14, 16 and 25-27 should also be allowed at least based on their dependence from independent claims 1, 7 and 10.

Claims 2-3 and 11-12 are said to be unpatentable under 35 U.S.C. §103(a) over Domoto and Yamada.

It is respectfully submitted that claims 2-3 and 11-12 should be allowed at least based on their dependence from independent claims 1 and 10.

Claim 15 is said to be unpatentable under 35 U.S.C. §103(a) over Domoto and Gerasimov.

It is respectfully submitted that claim 15 should be allowed at least based on its dependence from independent claim 10.

Claims 17 and 28 are said to be unpatentable under 35 U.S.C. §103(a) over Domoto and Cole.

It is respectfully submitted that independent claim 17 should be allowed for the same reasons discussed above in connection with independent claims 1 and 10. In particular, Domoto does not disclose or suggest "the decreasing hardness of the second layer decreasing from outer portions of the second layer toward a center of the second layer and

meeting at the center of the diffusion layer to form a minimum peak at the center, wherein a **hardness at the center** of the diffusion layer **is an original hardness** the stainless steel," as recited in independent claim 17. (Illustrative emphasis provided) Further, these features are not 'intrinsic' as discussed above in connection with independent claims 1 and 10. Cole is cited to allegedly show other features and does not remedy the deficiencies in Domoto.

Accordingly, it is respectfully submitted that independent claim 17 is allowable, and allowance thereof is respectfully requested. In addition, it is respectfully submitted that claim 28 should also be allowed at least based on its dependence from independent claim 17.

In addition, Appellants deny any statement, position or averment of the Examiner that is not specifically addressed by the foregoing argument and response. Any rejections and/or points of argument not addressed would appear to be moot in view of the presented remarks. However, Appellants reserve the right to submit further arguments in support of the above stated position, should that become necessary. No arguments are waived and none of the Examiner's statements are conceded.

CONCLUSION

Claims 1-7, 10-17, and 25-28 are patentable over Domoto, Oiwa, Rosenhan, AAPA, Liang, Blawert, Askeland, Lim, Yamada, Gerasimov and Cole.

Thus, the Examiner's rejections of claims 1-7, 10-17, and 25-28 should be reversed.

Respectfully submitted,

By_____
Dicran Halajian, Reg. 39,703
Attorney for Appellants
January 29, 2010

THORNE & HALAJIAN, LLP
Applied Technology Center
111 West Main Street
Bay Shore, NY 11706
Tel: (631) 665-5139
Fax: (631) 665-5101

CLAIMS APPENDIX

1.(Previously Presented) A cutting element as used in an electric shaver, manufactured from maraging or precipitation-hardenable stainless steel with a surface hardened by plasma nitriding, wherein the cutting element is precipitationally hardened simultaneously with the plasma nitriding on all surfaces of the cutting element to form a surface top layer of steel supersaturated with nitrogen and a diffusion layer adjoining the top layer with a hardness ranging from the hardness of the top layer to the hardness of the steel before hardening so that the top layer has a substantially uniform hardness and the diffusion layer has a decreasing hardness with depth of the diffusion layer, the decreasing hardness of the diffusion layer decreasing from outer portions of the diffusion layer toward a center of the diffusion layer and meeting at the center of the diffusion layer to form a minimum peak at the center, wherein a hardness at the center of the diffusion layer is an original hardness the stainless steel.

2.(Previously Presented) The cutting element as claimed in claim 1, wherein a thickness of the hardened supersaturated top layer ranges from 5 μm to 25 μm.

3.(Previously Presented) The cutting element according to claim 1, wherein a thickness of the diffusion layer ranges from 5 μm to 20 μm.

4.(Previously Presented) The cutting element according to claim 1, wherein the hardness of the hardened supersaturated top layer is at least 1300 HV and the original hardness at the center of the diffusion layer is 200HV.

5.(Previously Presented) The cutting element according to claim 1, wherein the cutting element is designed for use in a shaver of a dry shaver type.

6.(Previously Presented) The cutting element according to claim 1, wherein the cutting element is designed for use in a shaver of an additive shaver type.

7.(Previously Presented) An electric shaver comprising a cutting element, the cutting element being precipitationally hardened simultaneously with plasma nitriding on all surfaces of the cutting element to form a surface top layer of steel supersaturated with nitrogen and a diffusion layer adjoining the top layer with a hardness ranging from the hardness of the top layer to the hardness of the steel before hardening so that the top layer has a substantially uniform hardness and the diffusion layer has a decreasing hardness with depth of the diffusion layer, the decreasing hardness of the diffusion layer decreasing from outer portions of the diffusion layer toward a center of the diffusion layer and meeting at the center of the diffusion layer to form a minimum peak at the center, wherein a hardness at the center of the diffusion layer is an original hardness the stainless steel.

Claims 8-9 (Canceled)

10.(Previously Presented) An electric shaver, comprising:

a stainless steel cutting element having a hardened layer on all surfaces of a blade and being precipitationally hardened simultaneously with plasma nitriding on the all surfaces of the cutting element to form a surface top layer of steel supersaturated with nitrogen and a diffusion layer adjoining the top layer with a hardness ranging from the hardness of the top layer to the hardness of the stainless steel before hardening so that the top layer has a substantially uniform hardness and the diffusion layer has a decreasing hardness with depth of the diffusion layer, the decreasing hardness of the diffusion layer decreasing from outer portions of the diffusion layer toward a center of the diffusion layer and meeting at the center of the diffusion layer to form a minimum peak at the center, wherein a hardness at the center of the diffusion layer is an original hardness the stainless steel.

11.(Previously Presented) The electric shaver as claimed in claim 10, wherein a thickness of the hardened supersaturated top layer ranges from approximately 5 μm to approximately 25 μm.

12.(Previously Presented) The electric shaver as claimed in claim 10, wherein a

thickness of the diffusion layer ranges from approximately 5 μm to approximately 20 μm.

13.(Previously Presented) The electric shaver as claimed in claim 10, wherein the hardness of the hardened supersaturated top layer is at least 1300 HV and the original hardness at the center of the diffusion layer is 200HV.

14.(Previously Presented) The electric shaver as claimed in claim 10, wherein the shaver is a dry shaver.

15.(Previously Presented) The electric shaver as claimed in claim 10, wherein the shaver is an additive shaver.

16.(Previously Presented) The electric shaver as claimed in claim 10, wherein the shaver comprises a plurality of cutting elements.

17.(Previously Presented) A method comprising the acts of:

forming a cutting element from austenitic stainless steel; and

precipitationally hardening the cutting element at a same temperature simultaneously with plasma nitriding on the all surfaces of the cutting element to form a first layer having a substantially uniform hardness and a second layer having a decreasing hardness with depth of the second layer, the decreasing hardness of the second layer

decreasing from outer portions of the second layer toward a center of the second layer and meeting at the center of the diffusion layer to form a minimum peak at the center, wherein a hardness at the center of the diffusion layer is an original hardness the stainless steel.

Claims 18-24 (Canceled)

25.(Previously Presented) The cutting element of claim 1, wherein the hardness of the hardened supersaturated surface top layer is at least six times the original hardness at the center of the diffusion layer.

26.(Previously Presented) The electric shaver of claim 7, wherein the hardness of the hardened supersaturated surface top layer is at least six times the original hardness at the center of the diffusion layer.

27.(Previously Presented) The electric shaver of claim 10, wherein the hardness of the hardened supersaturated surface top layer is at least six times the original hardness at the center of the diffusion layer.

28.(Previously Presented) The method of claim 17, wherein the simultaneously hardening is performed until a hardness of the first layer is at least six times the original hardness at the center of the second layer.

EVIDENCE APPENDIX

None

RELATED PROCEEDINGS APPENDIX

None